

# **Committee of Visitors Report to the High Energy Physics Advisory Panel**

**Submitted by the Committee of Visitors  
to the Office of High Energy Physics  
Office of Science  
Department of Energy**



**Barry Barish  
HEPAP  
18-April-04**

# The Charge From Ray Orbach



Department of Energy  
Office of Science  
Washington, DC 20585

August 12, 2003

Office of the Director


Professor Frederick Gilman  
DOE/NSF High Energy Physics Advisory Panel  
Carnegie-Mellon University  
5000 Forbes Avenue  
Pittsburgh, PA 15213

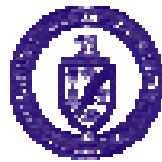
Dear Professor <sup>Fred</sup>Gilman:

This letter requests that the High Energy Physics Advisory Panel (HEPAP) establish a Committee of Visitors (COV) through which HEPAP can provide an assessment on a regular basis of process-related matters pertaining to the management of the Department of Energy Office of Science High Energy Physics program. The COV should review High Energy Physics (HEP) program management every three to four years providing an assessment of the effectiveness, efficiency, and quality of the processes used to solicit, review, recommend, and document proposal actions and monitor active projects and programs. In addition, the COV should also comment on how the award process has affected the breadth and depth of the HEP portfolio elements, and its national and international standing. The High Energy Physics Advisory Panel should work with the Acting Associate Director of the Office of Science for High Energy Physics to establish the processes and procedures for the first COV to occur in 2003.

I appreciate HEPAP's willingness to take on this important activity, and I look forward to meeting with you and learning of your progress in this important task.

Sincerely,

  
Raymond L. Orbach  
Director



March 1, 2004

# Detailed Charge From Robbin Steffin

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Professor Barry C. Barish  
Department of Physics  
California Institute of Technology  
1200 E. California Boulevard  
Pasadena, California 91125

Dear Dr. Barish:

Thank you for agreeing to chair the fiscal year (FY) 2004 Committee of Visitors (COV) for the Office of High Energy Physics (OHEP). The COV Review will take place at the Department of Energy (DOE) Facility in Germantown, Maryland, on March 8-9, 2004. The COV is an *ad hoc* subcommittee formed in response to a charge to the High Energy Physics Advisory Panel (HEPAP).

DOE is looking to the COV to assess its program management, to provide advice to improve OHEP performance, and to ensure openness to the research and education community served by the DOE. Reports generated by this COV will be used in assessing agency performance in order to meet government-wide performance reporting requirements, and will be made available to the public. The COV is charged to address and prepare a report on:

- the integrity and efficiency of processes used to solicit, review, recommend, and document proposal actions;
- the integrity and efficiency of processes used to review, recommend, authorize, and document funding actions under the Management and Operations contracts in place at the DOE national laboratories;
- the overall quality and significance of the results of the Office's program-wide investments;
- the relationship between award decisions, program goals, and Office of Science-wide programs and strategic goals;
- the Office's research investment, balance, and priorities;
- the organization, effectiveness, and adaptability of the OHEP operation to the evolving research environment.
- any other issues that the COV feels are relevant to the review.

Decisions to award or decline proposals are ultimately made by OHEP staff whose informed judgment is based on evaluations by qualified reviewers who reflect the breadth and diversity of the proposed activities and the community. Systematic examination by the COV of a wide range of OHEP's funding decisions provides an independent mechanism for monitoring and evaluating the overall quality of the Office's decisions on proposals, program management and processes, and results.

# Detailed Charge From Robbin Staffin

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The review will assess operations of individual activities in OHEP as well as the Office as a whole for three fiscal years: FY 2001, FY 2002, and FY 2003. The activities under review include:

- Laboratory facilities and research
- University research
- Accelerator R&D
- Project management

The general outline of the meeting will be an introductory session in which I will present an overview of the Office's activities, programs, and plans. Following this session, the COV will break into subgroups, and at these individual meetings, an appropriate OHEP staff member will provide a more in-depth discussion of the particular group activity as well as a review of statistical information and procedures. The subgroups will then examine program documentation and results and prepare program-level review reports. The following day, there will be a review of the Office as a whole and preparation of an Office-level report, based on the program-level reports and other material as appropriate.

Drafts of the program-level reports and the Office-level report will be completed during the COV meeting. I ask that you finalize and submit the full report by April 5, 2004, to allow time for comment and distribution of the report to the full HEPAP prior to their meeting on April 18-19.

The agenda for the review will be made available to you in the near future. Also, to assist the committee, we have established a private web site (<http://doe-hep.hep.net/COV/>) on which we will be posting background information for your perusal prior to the review. The password for this site has been provided to you and the other members by an email from Marsha Marsden. The material posted to this website and other information will be available for the Committee's use at the Review. Please feel free to contact me (301-903-3624, [robin-staffin@science.doe.gov](mailto:robin-staffin@science.doe.gov)) or Ann Kirtland, (301-903-2623, [ann.kirtland@science.doe.gov](mailto:ann.kirtland@science.doe.gov)) if you have questions about the review.

Travel and hotel arrangements are being handled by our support services contractor, ORISE. A representative from that organization will be contacting you and the other committee members shortly to make arrangements.

Thank you again for your willingness to participate in this important activity. I look forward to seeing you at the meeting.

Sincerely,

/S/

Robbin Staffin  
Associate Director  
Office of High Energy Physics

Enclosures

# **COV Subgroup**

## ***National Laboratory Team***

**Jack Ritchie – Team Leader for National Laboratories**  
University of Texas at Austin

**Peter Bond**  
Brookhaven National Laboratory  
Upton, New York

**Edward Blucher**  
University of Chicago

**David MacFarlane**  
University of California at San Diego

# **COV Subgroups**

## ***University Team***

**Raymond (Chip) Brock – Team Leader for Universities**  
Michigan State University

**George Sterman**  
State University of New York - Stony Brook

**Marjorie Corcoran**  
Rice University

**Mel Shochet**  
University of Chicago

**A.J.S. Smith**  
Princeton University

# **COV Subgroup**

## ***Accelerator Team***

**Maury Tigner –**  
**Team Leader of Accelerator Group**  
Cornell University

**Michael Harrison**  
Brookhaven National Laboratory

**Chan Joshi**  
University of California at Los Angeles

**Patrick O'Shea**  
University of Maryland

**Nan Phinney**  
Stanford Linear Accelerator Center

# **COV Subgroups**

## ***Large Project Team***

**Gary Sanders – Team Leader for Projects**  
**California Institute of Technology**

**Ian Corbett**  
**European Southern Observatory**

**Jay Marx**  
**Lawrence Berkeley National Laboratory**

**Bill Willis**  
**Columbia University**



# Overall Recommendations

The COV found the overall functioning of the OHEP office to be very professional and we are impressed with the responsible and excellent job that is done in soliciting and evaluating proposals, making grants and monitoring the funded programs. However, the COV did find some areas of concern.

In this report we make a variety of observations, recommendations and suggestions where we believe that the functioning of the office could be improved. And, we believe that such improvements will lead to similar improvements in the quality of the research program that is carried out in high energy physics.

# Overall Recommendations

The first and most serious problem that we found throughout our review is that OHEP is very seriously understaffed, due to a combination of unfilled positions, and needs for new positions to carry out functions where the office is presently deficient. Unfortunately, we believe this staffing problem is so paramount that several other areas of concern that we have identified in this report may well just represent consequences of the understaffing. As a result, our first and most important recommendation is that a vigorous effort be made to recruit staff to fill the unfilled positions in OHEP and that requests be made to increase staffing in selected areas that are pointed out in this report. Successful recruitment is crucial to the operation of all of HEP and it will take the help and cooperation of the entire community to identify and recruit the very best candidates.

*Recommendation: OHEP should strive to fill its unfilled positions as soon as possible and to request authorization to create the new positions outlined in this report.*

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# Overall Recommendations

The lack of travel funds is limiting the ability of OHEP to carry out its program evaluations and review processes in an effective manner. Site visits are an essential part of the process.

*Recommendation: OHEP should make every effort to increase the travel funds available for site visits to review and monitor the program.*

# Overall Recommendations

The committee believes that the functions of the office would be greatly improved by adding a dedicated program-planning function. This function will require dedicated personnel, as well as putting financial and other HEP data into a database and developing and using modern computer tools. We believe this will enable analysis of budget action implications, improve the ability to do long range studies or analysis, etc.

*Recommendation: OHEP should develop a program-planning function to optimize the use of program resources, including implementation of modern software tools and data bases.*

# Overall Recommendations

The COV concludes that a concerted effort should be made to make sure that, as much as possible, funding decisions are based primarily on the factors that will lead to the strongest possible program. In general, the highest priority should be given to excellence, program priorities and more generally, dedicating the resources in ways that will enable the most successful program.

*Recommendation: OHEP should make funding decisions based primarily on excellence, priorities within HEP and the overall success of the program. Where possible, budget reductions or increases should be implemented strategically, rather than simply across-the-board.*

# The COV Review Process

- A website was created that contained useful materials
  - Information on the grant processes, important statistical information on grants and a complete list of University grants.
- Overview presentations were made to the entire committee at the beginning of the meeting
- COV divided into four teams covering the major activities in HEP: National Labs, Universities, Accelerators and Major Projects.
  - Teams reviewed funding actions for the years 2001, 2002 and 2003.
  - Selected sample folders representative of the program, as well as other pertinent information were reviewed
  - Each team carried out detailed question and answer sessions with DOE program managers in their sub-area
- The efficacy of the OHEP processes was reviewed, as well as how the actions reflect the priorities, investments and balance in the field.

# Integrity and Efficacy of the Processes for Treating Proposals

- **National Laboratories - Process and Conclusion**
  - Documents of a number of types were examined: laboratory FWPs, copies of budget presentations made by laboratory managers, letter reports for annual program reviews, an initial financial plan and one of its monthly amendments, and a variety of tables summarizing funding to laboratories over time and by category.
  - Subsequently, the subcommittee met with the OHEP Facility Operations team to pursue a number of questions and issues
  - The findings of the COV are that the proposal and review processes for the national laboratories are validated as being effective and well conducted.
- **Accelerators - Conclusion**
  - The solicitation process for accelerator R & D proposals is done via the Federal Register. The procedure appears adequate for the universities, the smaller National Lab HEP programs and industry.

# Integrity and Efficacy of the Processes for Treating Proposals

- The University Program - Conclusions
  - Excellent oversight of the university program. Proposals given thorough peer review, often with ten or more reports from referee reports.
  - In most cases, the change in support level for renewing grants reflects the external assessment.
  - The decision on approving new proposals, which are mostly in theory, seems well grounded in peer review, but limited by budget constraints
  - The ability of referees to provide timely reviews of proposals is adversely affected by the multi-hundred-page length of some proposals.
  - The issue of groups seeking to move from one HEP agency is a complicated issue, but one worthy of further consideration.
  - The COV believes that some form of comparative review for university grants should be instituted



# **Integrity and Efficacy of the Program Management of the National Laboratories and for Large Facilities**

- **Laboratory Budgets and Facility Monitoring: Conclusions**
  - A bottom-up analysis of laboratory budgets should be undertaken every few years.
  - The information on laboratory budgets should be collected in a uniform format and tracked annually.
  - Operations reviews for the laboratories should be conducted by OHEP staff
  - Implement certification for DOE project managers
  - Fill open positions and possibly expand the number of positions to perform large facility and laboratory monitoring. A larger team is required to perform adequate monitoring.

# Outcome of the Program's Proposal Processes and Program Management Functions

- Overall Quality and Significance of the Results of the Office's Program-Wide Investments -- Universities
  - The overwhelming impression of the COV is that the current program has consistently produced, and continues to produce, much of the leading research in high energy physics worldwide.
  - The year-to-year turnover in principal investigators is generally modest, reflecting to some extent the long-term stability necessary in the design, construction and execution of modern accelerator and non-accelerator experiments. In the Universities, OHEP dedicates significant resources to theoretical, as well as experimental physics, and these grants have relatively stable long-term support.
  - A general question arises as to the balance of support to large in-house laboratory-based research programs, as compared with university-based research programs.

# Outcome of the Program's Proposal Processes and Program Management Functions

- Overall Quality and Significance of the Results of the Office's Program-Wide Investments -- Universities
  - Funding history and program continuity play important and appropriate in OHEP renewal decisions. Strong justification should be required for making budget decisions based to any large extent on continuity
  - One problem that that we have identified, however, is the difficulty investigators have in seeking funding from the agency that is not their traditional source. As serious, this "identity" of researchers with agencies can present difficulties for an "NSF" scientist to participate in "DOE" projects and vice versa

# Outcome of the Program's Proposal Processes and Program Management Functions

- Overall Quality and Significance of the Results of the Office's Program-Wide Investments -- Accelerator Research
  - In the Advanced Technology R&D program the results have generally been very good with outstanding examples, such as superconducting magnet R&D and the developments in superconducting materials that have enormously wide impact (beyond HEP), plasma devices for acceleration and manipulation of beams, fundamental beam theory and experiments and support for future facilities such as linear collider and neutrino factory R&D.

# Outcome of the Program's Proposal Processes and Program Management Functions

- Overall Quality and Significance of the Results of the Office's Program-Wide Investments -- **The National Laboratories**
  - The HEP programs in the U.S national laboratories are well aligned with the program goals and strategic priorities of the field.
  - Fermilab's proton accelerators are the foundation of much of the U.S. HEP program, with CDF and D-Zero currently running and NuMi/MINOS preparing to take data in 2005. Fermilab is also prominent in the U.S. participation on the LHC accelerator and the CMS detector for LHC.
  - SLAC's electron accelerators provide another focus of the U.S. HEP program, as currently manifested in the PEP-II B-factory experiment BaBar and the lab's leadership role in linear collider R&D.

# Relationship between Award Decisions, Program Goals, and Office of Science-wide Programs and Strategic Goals

- The accelerator development component of the program is well aligned with current program goals.
- The University Program officers have complied appropriately with recommendations to support U.S. HEP program goals.
  - A possible manpower and resource problem will occur when LHC experiments increase University participation while the Tevatron experiments continue their programs.
  - Large differences exist in resources per faculty member across the university grants. COV was unable to determine whether the differences were justified on the basis of the quality of the programs. The issues of history and lack of comparative review increase the burden on justification
- The OHEP has a delicate balancing act between the needs of the national labs and the needs of the university program. COV got no insight into how this balance is achieved.

# Opportunities for Proposal Process and Program Management Improvement

- **National Laboratories** -- No major changes in the annual review process appear to be needed, although the subcommittee does suggest adjusting policy in some areas.
  - The annual program reviews should provide timely feedback to the labs and the labs' responses should be tracked.
  - The new policy that laboratory managers provide a formal written response to the annual review report is a positive step. The COV further recommends that OHEP implement a mechanism to follow up on laboratory responses when specific problems have been identified
- At Fermilab and SLAC, the annual program reviews focus on the physics program of the laboratory, but do not include any mechanism to review the physics research groups of those laboratories
  - The subcommittee does not recommend a specific process, but strongly recommends OHEP developing uniformity of review between physics research groups in the national labs and in the university community.

# Opportunities for Proposal Process and Program Management Improvement

- Large Facilities

- The subpanel recommends that change control approval by field office staff be carried out in close and prompt communication with the cognizant staff in the OHEP office.
- The panel recommends that the OHEP staff be included in parallel in the DOE acquisition review process that takes place at DoE Forrestal
- The HEP Laboratories must be fully accountable to deliver project performance within realistic resources. These include realistic deployment of financial, human and technology base resources.



# Opportunities for Proposal Process and Program Management Improvement

- Universities
  - It is imperative that travel funds be allocated to allow program officers to make regular site visits to their university programs.
  - A more uniform proposal format would, with length limits, make more efficient review and planning possible
  - Consideration should be given to increasing the University professional staff by at least one person in order to make planning possible and to separate overall management

# Further Observations and Recommendations

- Large experiments in HEP receive funding through many channels. These channels include DOE project funding, national laboratories funding for facility operations at Fermilab and SLAC, laboratory physics research in all the labs with HEP programs, and grants to university groups.
  - Need to develop mechanism to look at these projects globally and to internally optimize the distribution of funding through the different channels that it provides.
- Both Fermilab and SLAC currently are active in a number of non-accelerator experiments. The question arises how these research initiatives should be treated and OHEP needs to define a process for appropriate consideration of such laboratory initiatives.

# Further Observations and Recommendations

- Increasingly, major project opportunities arise that involve multi-agency support. We recommend that the process for identifying, developing, executing, and monitoring interagency projects must be better defined. Identifying these should make full use of shared advisory mechanisms such as HEPAP, SAGENAP, or P5. We further recommend that orderly and consistent means of consultation and coordinated review and coordinated funding decisions be developed.
- It should be noted that the recent difficulties with the Tevatron indicate that the system, by which we mean the totality of the Labs, the HEP User community, as well as OHEP, did not work as well as it should have. How can such problems be avoided in the future? This COV review was too brief to probe the issue and it needs further attention to find out the “lessons learned.”

# Central Result of the COV review

- The COV found the overall functioning of the OHEP office to be very professional and we are impressed with the responsible and excellent job that is done in soliciting and evaluating proposals, making grants and monitoring the funded programs.